ABSTRACT

While a fine porous diamond particle film has been known as a high heat resistant and low dielectric constant film and also has high mechanical strength and heat conductivity, and is expected as an insulating film for multi-layered wirings in semiconductor integrated circuit devices, it is insufficient in current-voltage characteristic and has not yet been put into practical use. According to the invention, by treating the fine porous diamond particle film with an aqueous solution of a salt of a metal such as barium and calcium, the carbonate or sulfate of which is insoluble or less soluble, and a hydrophobic agent such as hexamethyl disilazane or trimethyl monochlolo silane, as well as a reinforcing agent containing one of dichlorotetramethyl disiloxane or dimethoxytetramethyl disiloxane, thereby capable of putting the dielectric breakdown voltage and the leak current within a specified range of a practical standard.